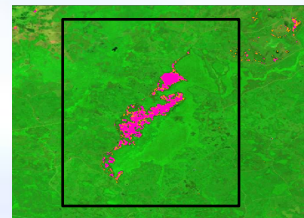
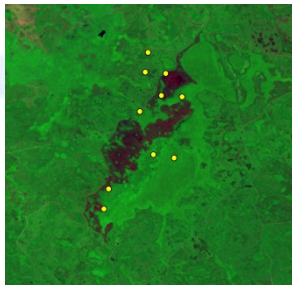
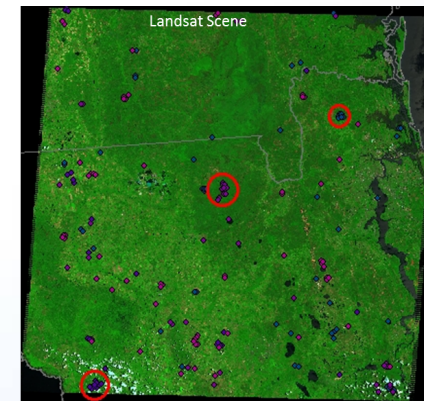
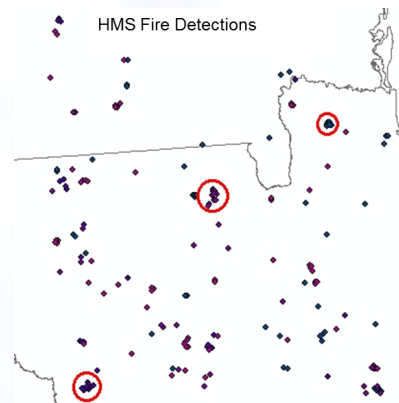
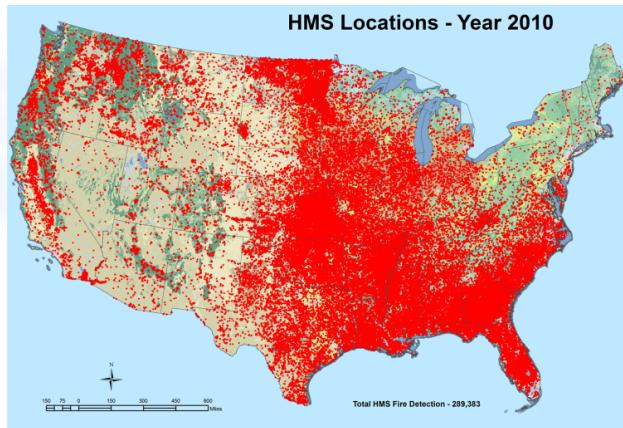


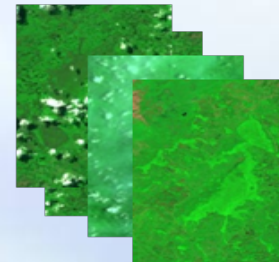
# Project Title and Brief Abstract



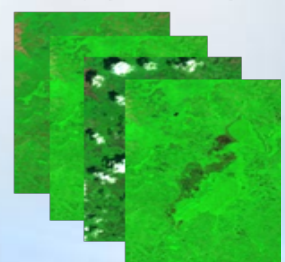
- Utilizing Multi-Sensor Active Fire Detections to Map Fires in the US
- Stephen Howard, Joshua Picotte; USFS Florida, Grand Canyon NP
- Using satellite fire detections to help identify fire occurrence, delineate burned areas and support assessment of fire impacts
- AVHRR, MODIS, GOES, VIIRS, Landsat



Pre-fire



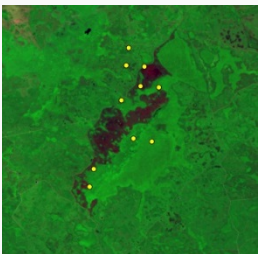
Post-fire



**Purpose and Objective**

We intend to implement automated processes to speed fire assessment by MTBS analysts, and develop Open Source software tools to allow local fire analysts to map fires that MTBS will not assess due to current minimum size constraints. Greater efficiency may allow a programmatic change to assess fires that currently are not considered (i.e. state Rx, and perhaps smaller fires).

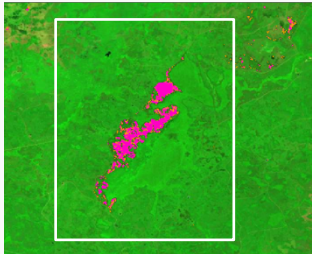
*Societal Benefit Area: Ecological assessment*  
*Geographic Focus: United States and Puerto Rico*  
*End-Users: MTBS analysts, local fire managers*



Active Fire Detections

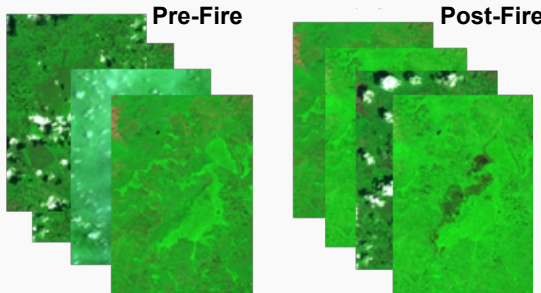


Burned Area ECV



Determine Bounding Box

Automatically: determine perimeter, bounding box; then order, process and subset pre- and post-fire Landsat scenes. Scene package delivered to MTBS analysts to pick best scenes and start automated burn severity assessment; then analyst reviews and edits results as needed.



**Approach**

Identify fires (date and location) using satellite - based active fire detections and scanned Landsat imagery (ECV). From this information, candidate Landsat imagery will be automatically ordered, processed, and subset. Default burn severity thresholds derived from MTBS historical archive will be applied for preliminary assessment.

*Risk: false positives with ECV assessment, analyst must confirm detection is actual fire scar.*

*Concern: Still waiting (over 2 years) for automatic Landsat ordering, hopefully, now in development.*

**Key Milestones**

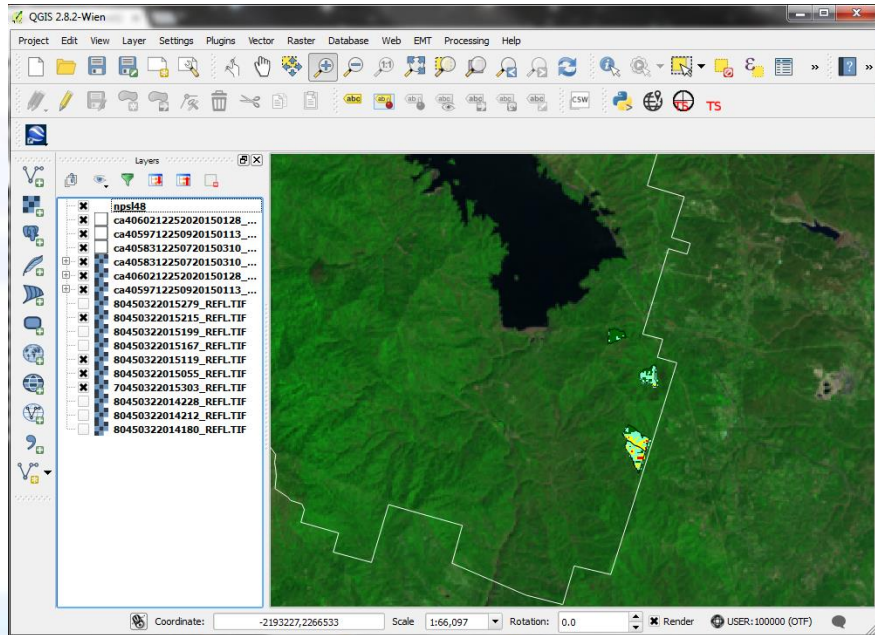
Milestone Statement	Date
Deliver beta version open source viewer tool to RSAC	02/16
Complete machine-to-machine Landsat ordering interface (?)	04/16
Complete beta version stand-alone open source software tool	06/16
Complete development of Open Source User Tool	12/16
Estimate magnitude to undocumented historical fires	06/17
Operational use by MTBS	10/17



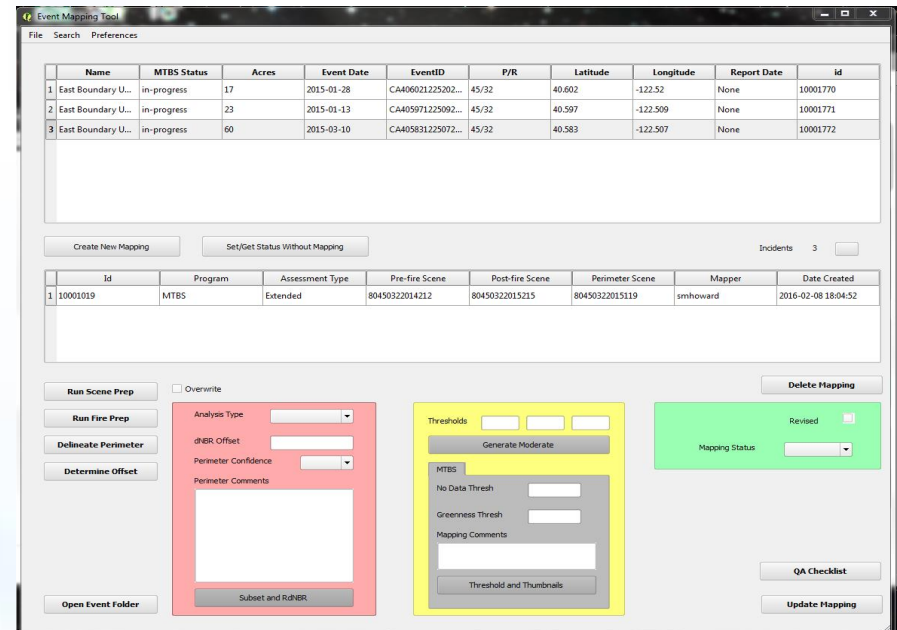
# Biggest Achievement or Advancement to Date



## Beginning Development of Open Source Fire Mapping Tools



QGIS-Based Landsat Viewer/  
GIS Interface



Spatialite, GDAL and Python Scripts  
for image processing & fire mapping





**Largest challenges in project so far:**

**Lack of timely development and delivery of required technical means:**

**Machine-to-machine Landsat Ordering Interface  
Initially promised December 2013 (now May 2016)**

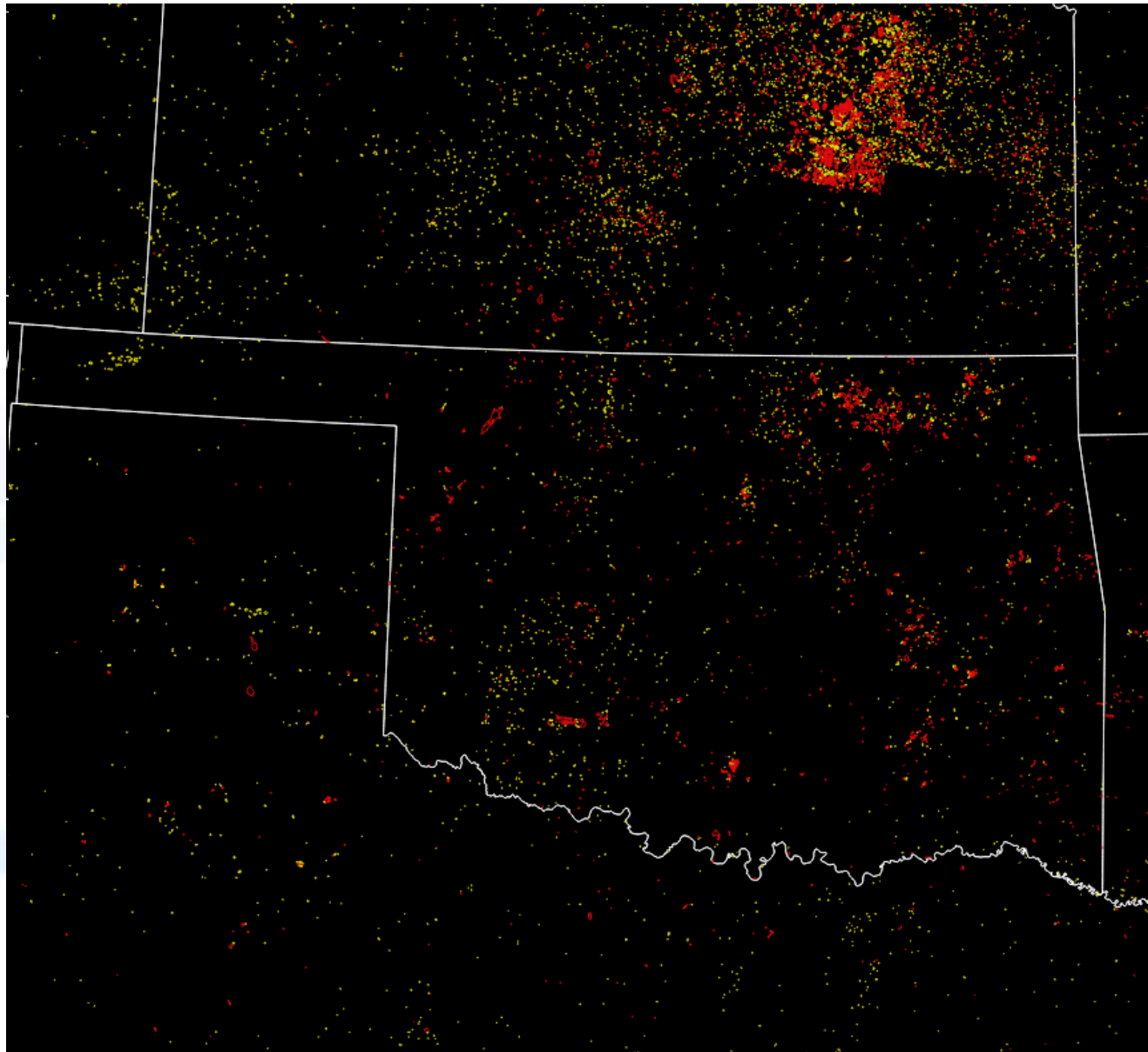
**Co-I, Michael Coan, left the project in January 2015.**



# Multi-Sensor Fire Mapping

Stephen Howard, USGS/EROS.

As of:  
Feb 2016



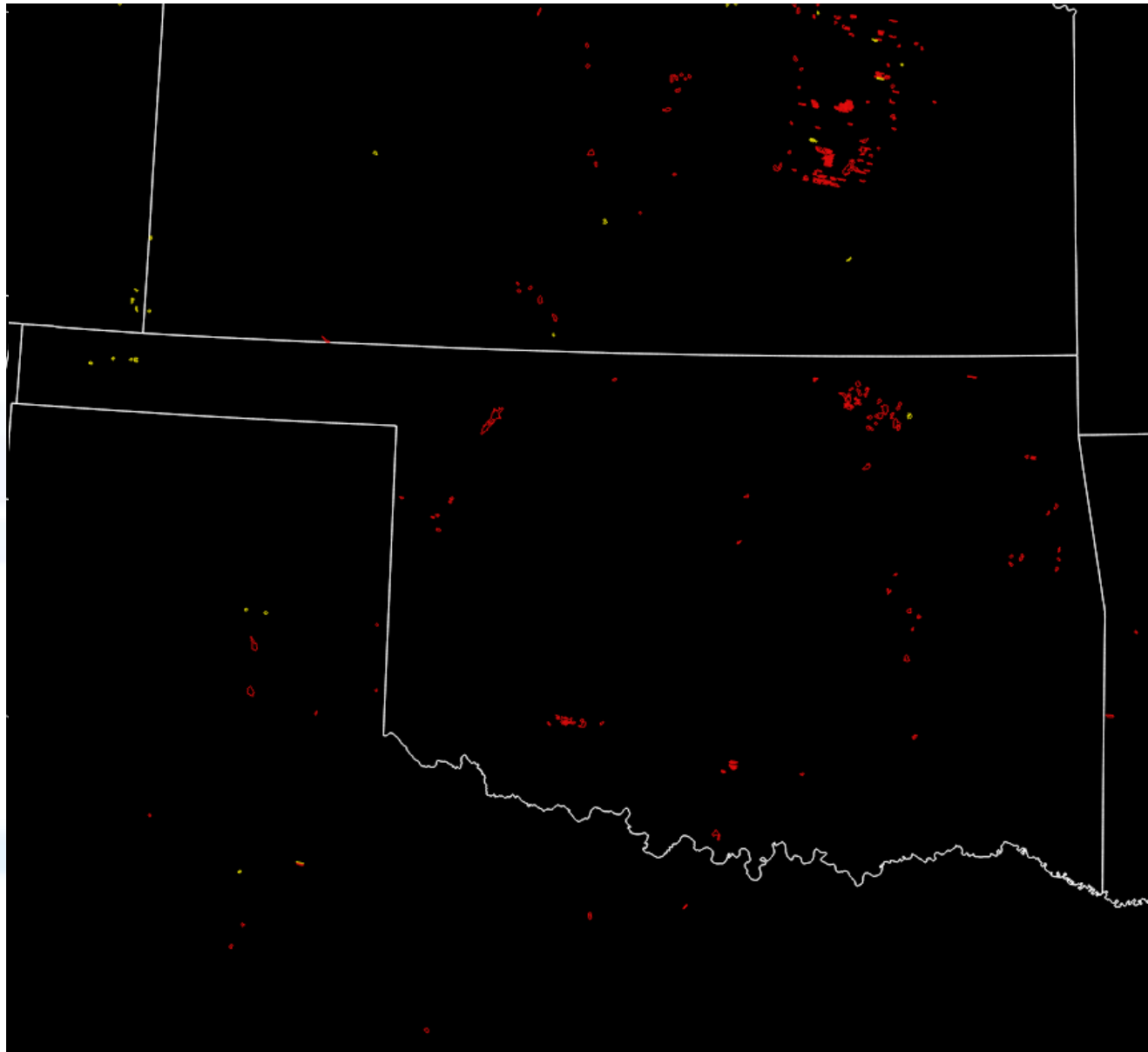
Landsat-Derived  
Burned Area  
Essential Climate  
Variable (BAECV).  
Red=Intersects with  
active fire detection.  
Yellow does not.

10 acre minimum  
mapping unit.

# Multi-Sensor Fire Mapping

Stephen Howard, USGS/EROS.

As of:  
Feb 2016



Landsat-Derived  
Burned Area ECV  
Red = Intersects  
with active fire  
detection. Yellow  
does not.

500 acre minimum  
mapping unit.



# PI Overall Assessment



## Summary of Challenges; Problems; Objective Analysis

Delay in developing automated Landsat scene ordering API has hampered ARL progress. However, work on API has commenced (I know because one of my staff on a different project was hired away to work on it). The API should be completed April/May 2016.

Loss of Co-Investigator impacts development of path/row specific Burned/Not Burned algorithms. Fall back has been to use Burned Area Essential Climate Variable or for remaining team to absorb that task.

## Summary of Positive Progress

Fire Histories for Grand Canyon and three National Forests in Florida have been generated, but need to be reviewed and delivered.

Beginning development of open source tools for fire assessment.

CONUS area Burned Area ECV will be completed for years 2013, 2014 and 2015 (polygons intersected with active fire detections).

---

## Overall Assessment

Frustrating delay but we see cause for optimism and renewed progress.

# PI Assessment of Future Project Progress



If the API for automated Landsat ordering is completed, the path opens for full development and integration of automated fire detection and processing with minimal analyst intervention. We hope to have a beta version of the integrated process ready by July 2016.

Incorporating BAECV into Landsat ground processing operations is planned but outside the control of this project.

How can NASA management help overcome obstacles?

This project faced a priority “obstacle” from within the “home” organization.

Is NASA management inclined to get involved with situations like this?

---

Budget progress and future plans to spend down the funding by year.





Beyond accomplishments already discussed,  
there is little more to “write home about.”

But Stay Tuned!



# *Deserving Team Member*



*Joshua Picotte*

*Is providing reality checks on the vision,  
technical expertise to bring it to fruition  
&  
stepping up to fill a gap.*



# *Creatively Define the Status of your Project*



A fire burns un-seen  
Did it renew or destroy  
the landscape we know

Was it big or was it small  
Should we worry about it

A bird's view will help  
us study what can be learned  
In time all is well